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ANNOUNCEMENTS

INTERNATIONAL SEMINAR ALGORITHMS AND COMBINATORICS

September 24–28, 1979, Ecole Nationale Supérieure des Mines, Sophia-Antipolis, France

This Seminar is organised by the Institut de Recherche d'Informatique et d'Automatique (IRIA) and the Ecole Nationale Supérieure des Mines de Paris.

Scientific Committee

G. Viennot (Chairman)	CNRS, University of California, San Diego
P. Flajolet	IRIA, LABORIA
D. Foata	Strasbourg University
J. Françon	CNRS, Strasbourg University
M. Nivat	Paris VII University, IRIA
J. Vuillemin	Paris Sud Orsay University, IRIA

Local organisation

G. Berry	Centre de Mathématiques Appliquées (E.N.S.M.P.)

Invited speakers

W. Burge (I.B.M., Yorktown Heights), J. Desarmenien (Strasbourg University), D. Dumont (Strasbourg University), P. Flajolet (IRIA, LABORIA), D. Foata (Strasbourg University), J. Françon (CNRS, Strasbourg University), A. Garcia (University of California, San Diego), G. Kreweras (Institute of Statistics, Paris University), A. Lascoux (Paris VII University), T. V. Narayana (Alberta University, Edmonton), M. P. Schutzenberger (Paris VII University), R. Stanley (M.I.T., Cambridge), V. Strehl (Nurenberg University, Erlangen), G. Viennot (CNRS, University of California, San Diego), J. Vuillemin (Paris Sud Orsay University), G. Williamson (University of California, San Diego).

General presentation

The purpose of the seminar is to demonstrate the close interactions between the design and analysis of algorithms and data structures on one hand and combinatorial geometry on the other. The seminar proposes to present a unified view of the two fields of algorithms and combinatorics, the focus being on the geometry of permutations.

The following points are to be developed:

(a) *Data structures.* Each data structure has a combinatorial structure of its own, as it appears from the consideration of binary search trees for instance. Vice versa, the geometrical correspondences among combinatorial objects often lead to new and efficient data structure representations: see for instance the use of heaps for representing priority queues.

(b) *Analysis of algorithms.* The combinatorial correspondences between objects make it possible to extract the basic parameters that determine the complexity of algorithms. They reduce the number of independent analyses for which they also provide direct estimates. Conversely the detailed analysis of the most fundamental algorithms often reveals new essential parameters.

(c) *Design of algorithms.* Accurate estimates of the complexity of algorithms are a preliminary step to optimization. Furthermore the knowledge of the distribution of basic parameters can lead to the design of new and more efficient algorithms.

These interactions are particularly clear in the case of permutations. Indeed permutations have a rich combinatorial structure and they appear as tournament trees, Young tableaus, ... They also form the structure underlying sorting, searching and file management algorithms.

Topics of the Seminar

Combinatorics

(1) *Combinatorics of permutations.* Permutations, inversion tables, inversion index, cycles, rises and falls, Eulerian polynomials.

(2) *Trees and plane paths.* Binary trees and forests, positive paths, Dyck words. The basic parameters: height, path, register function.

(3) *Correspondences between trees, permutations and plane paths.* Tournament tree associated with a permutation, projection and unfolding. Left-to-right minima, maxima, minima, double rises and double falls.

(4) *Young tableaus and permutations.* Young tableaus, the Robinson–Schensted algorithm. Skeleton of a permutation, shadow regions in the plane. Increasing subsequences: construction of the largest subsequence. Green's theory.

(5) *Geometrical theory of classical numbers.* Euler and Genocchi numbers, Eulerian polynomials, Jacobi elliptic functions, involutions and Hermite polynomials.

Algorithmics

(1) *Binary search trees.* Tournament trees and binary search trees (leaf insertion) geometrical analysis of implementations, comparison with root insertion.

(2) *Priority queues.* Representation of priority queues as tournament trees. Binomial files, perfect tournaments and pagodas. Geometrical analysis of the pagoda implementation. Comparisons.

(3) *File histories and continued fractions.* Permutations, labelled paths and file histories. Randomness of a data structure. Enumerations relative to the structures of priority queue and dictionary. Continued fractions and orthogonal polynomials, analyses of sequences of operations on data structures, the integral cost theorem.

Location

Ecole Nationale Supérieure des Mines, Sophia-Antipolis, 06560 Valbonne, France.

Train: 7 km from Antibes,

Plane: 20 km from Nice, Côte d'Azur Airport.

Fees

200 Francs. Special conditions granted to students. Travels, meals and accomodation will be supported by the participants.

Working languages

English and French.

Programme

A detailed programme will be forwarded to future participants.

Secretariat

All information may be obtained from:

I.R.I.A., Public Relations Department
Domaine de Voluceau, B.P. 105
Rocquencourt, 78150 Le Chesnay, France
Tel. 954.90.20 Ext. 600
Telex: IRIA 697 033

ADVANCED COURSE ON GENERAL NET THEORY OF PROCESSES AND SYSTEMS

October 8–19, 1979, University of Hamburg, F.R.G.

This Advanced Course is held under the auspices of and financed by the Commission of the European Communities and the Ministry for Research and Technology of the Federal Republic of Germany.

The course is organized by and held at the Department of Informatics of the University of Hamburg in cooperation with the Gesellschaft für Mathematik und Datenverarbeitung (GMD), Bonn.

Directors of the course

W. Brauer	University of Hamburg
B. Randell	University of Newcastle upon Tyne
C. A. Petri	GMD Bonn

Lecturers

E. Best (University of Newcastle upon Tyne), H. J. Genrich (GMD Bonn), M. Jantzen (University of Hamburg), K. Lautenbach (GMD Bonn), J. D. Noe (University of Washington), H. Oberquelle (University of Hamburg), S. S. Patil (University of Utah), G. Roucairol (University of Paris VI), R. M. Shapiro (Meta Information Applications Inc., Wellfleet), K. Zuse (Hünfeld).

Scientific Coordinator

P. S. Thiagarajan GMD Bonn

Scientific Advisors

E. Stankiewiez-Wiechno	GMD Bonn
R. Valk	University of Hamburg

Local Organizing Committee

G. Friesland (Chairman), B. Krieg, C.-H. Schulz (Executive).

Aims and motives of the course

For several years now, 'Petri nets' have been in use for the detailed description of control flow in computers and other multi-component systems. Many isolated successful efforts have been made to adapt this simple instrument to a wider range of applications.

In this course, examples of such applications will be given, and a comprehensive framework which unifies, justifies and facilitates these efforts will be presented.

After an informal exhibition of small examples from different areas, a thorough introduction on General Net Theory will be presented, and the use of its mathematical and graphical tools will be exercised. A survey of formal results and of present applications will be suggested and discussed. The use of nets as a vehicle for interdisciplinary communication and transfer of structural knowledge will be demonstrated.

Net theory will be compared with related theories by pointing out differences in their axiomatic foundations. The limits to useful formalization will be outlined. Participants will be trained to use the basic tools correctly, in order to guide them to self-reliant application.

Main topics of the course

The course includes the following topics:

(1) *Aims and tools of net theory.* Areas of application; examples; graphic tools; net mathematics; net topology; concurrency theory (axiomatic foundations); nets, logic and time; net theory of physical and computational processes; synchrony; representation of static systems; conceptual framework of General Net Theory.

(2) *Basis for application.* Information flow on lowest level; the flux/influence distinction; systems of agencies and channels, their composition and decomposition; enlogic structure of processes and systems; net models of continuous processes; different types of restrictions; complexity of nets and computations.

(3) *Applications.* Communication disciplines; synchronisation; action plans and modes of cooperation; semantics of programming languages; concurrent programming; operating system problems; computer protocols; dialog systems; resource management; hardware problems; data security; process control; recovery; performance evaluation; description of complex structures.

Further information

For further information please contact

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